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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/504,813	02/16/2000	Shuji Goto	P99,2486	6161

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EXAMINER
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CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/504,813

Applicant(s)

GOTO ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 7-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 3, 2004 has been entered.

This Office action addresses claims 7-17. Claims 7-17 remain rejected over the prior art for substantially the reasons of record. Additionally, claim 17 is newly rejected under 35 USC §112, first paragraph. This action is non-final.

### ***Information Disclosure Statement***

2. The filing of an Information Disclosure Statement on 8/9/04 is acknowledged. However, neither the list of references nor the references themselves are currently viewable in the electronic file wrapper of this application. The IDS will be reviewed and the list of references included with the Examiner's next communication, or before that, if desired by Applicants.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 17 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 17 has been amended to recite the step of forming solid electrolyte layers on the electrodes “after pressing.” This appears to be an error in the placement of the limitation, but is considered to constitute new matter. To correspond with independent claim 1, the “after pressing” limitation should be inserted after the step of “winding said positive electrode and said negative electrode” in line 7.

***Claim Rejections - 35 USC § 103***

5. Claims 7-13, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narang et al (U.S. Patent 6,168,885) in view of Schneider et al (U.S. Patent 6,180,281) in view of Gozdz et al (U.S. Patent 5,840,087) in view of Kawakami et al (U.S. Pre-Grant Publication No. 2002/0064710).

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Regarding claims 7 and 17, In Figure 1 and in column 11, lines 4-12, Narang et al. generally teach a process for making a battery comprising the steps of coating a negative electrode with electrolyte (26), coating a positive electrode with electrolyte (36), and laminating the two electrode/electrolyte sheets together under heat (42) so as to form a single, continuous electrolyte. The laminating step is considered to be anticipatory of the claimed "pressing" step, since the artisan would immediately be able to envision such a pressing step. Regarding claims 8, 13, and 16, in column 10, lines 34-55, the reference teaches that the solid polymer electrolyte contains a plasticizer (swelling solvent) such as ethylene carbonate (EC) and dimethylcarbonate (DMC). Regarding claims 8 and 16, in column 11, lines 7 and 8, it is further taught that the electrolyte is gelled. Regarding claims 11 and 16, the electrolyte salt may comprise  $\text{LiPF}_6$ ,  $\text{LiBF}_4$ , and  $\text{LiAsF}_6$ , among others (see col. 10, line 23). Regarding claims 12 and 16, the electrolyte matrix polymer is preferably polyvinylidene difluoride (PVDF) (see col. 10, line 34).

The reference does not expressly teach that the electrode/electrolyte sheets are wound in the lengthwise direction of the sheets (i.e., that the laminate is spirally-wound), or that the electrolyte layers are formed into a "seamless" layer, as recited in claims 7 and 17. The reference further does not expressly teach that both sides of each electrode are coated with electrolyte (claims 7 and 17), or the temperature or duration of the lamination (claims 9 and 10).

The patent of Schneider et al. is generally directed to composite separator and electrode structures comprising seamless interfaces between the separator and electrodes (see abstract).

The patent of Gozdz et al. is directed to methods of making laminated batteries. As shown in Figure 6, an electrode (67) is coated on both sides with electrolyte material (64) prior to

lamination. Gozdz et al. further teach a lamination temperature of about 100-120 degrees C in column 5, lines 52-55.

The publication of Kawakami et al. is directed to rechargeable lithium batteries (see paragraph 82). In paragraph 141, the reference teaches that the batteries can be spirally-wound.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Schneider et al. to form the electrolyte layers of Narang et al. into a "seamless" layer. In column 6, line 30 et seq., Schneider et al. teach that "the interfaces between the advancing polymer boundaries having merged to lose completely any independent identity. The resulting structure is very pliant, translucent, and smooth, but extraordinarily strong, as shown in the Examples." The reference further teaches in column 2, line 65 et seq. that "the resultant composite allows ions to freely migrate from the electrode domain through the separator domain during successive charging and discharging of the battery." Accordingly, these teachings of Schneider et al. would motivate the artisan to form a "seamless" interface between the electrolyte layers of Narang et al.

Regarding the limitation that the electrodes are wound, the disclosure of Kawakami et al. would motivate the artisan to wind the electrodes of Narang et al. In paragraph 141, Kawakami et al. teach that "[i]n the case where the rechargeable battery is shaped in a spiral-wound cylindrical form, the anode, separator and cathode are arranged in the named order and they are spiral-wound and because of this, there are provided advantages such that the battery area can be increased as desired and a high electric current can be flown upon operating the charging and

discharging.” It is further noted that Narang et al. teach in column 3, line 17, in a discussion of the prior art, that “[o]ften, the various cells are spiral wound before being provided with a protective coating.” Accordingly, the artisan would be motivated by these disclosures, particularly that of Kawakami et al., to wind the electrodes of Narang et al.

Regarding the limitation in claims 7 and 17 that both sides of both electrodes are coated with electrolyte, the artisan would be sufficiently motivated to perform this step with the electrodes of Narang et al. Narang et al. teach at column 11, line 9 that “as many layers as necessary can be laminated together to provide the desired capacity of the final electrochemical cell.” This disclosure clearly indicates that both sides of each electrode may be coated (to result in, for example, a stacked cell configuration). Furthermore, as noted above, the artisan would be sufficiently motivated to use a spirally-wound configuration with the electrodes of Narang et al. In order to achieve such a configuration, the artisan would understand that an electrically insulating material would have to be present on both sides of each electrode in order to prevent a short circuit. In view of Narang’s teaching of multi-layer cells above, the coating of electrically insulating, ion-conductive electrolyte material on both sides of each electrode would be an obvious way of eliminating such a short circuit. The artisan could further look to the patent of Gozdz et al., which, as noted above, teaches a double-sided electrolyte coating on an electrode in Figure 6. In column 6, line 39, Gozdz et al. teach that “prior to assembly and lamination at step (c), carrier films 62 are removed (not shown) to expose the unblemished surfaces of facing separator/electrolyte layers 64, 64 which may then be laminated under reduced temperature and pressure conditions to effect a homogeneous, cohesive bond completing battery cell 50.” Thus,

it is noted that Gozdz et al. also teach a “seamless” bond in addition to a double-sided electrolyte coating.

Regarding the temperature and time limitations recited in claims 9 and 10, as noted above, Gozdz et al. teach a lamination temperature of about 100-120 degrees C, which overlaps with Applicant’s claimed range of 70 to about 100 degrees. Accordingly, Applicant’s claimed range would be rendered obvious by the disclosure of Gozdz et al. Further, the recitation of heat treatment “for ten minutes” is also not considered to distinguish over the references. The artisan would possess sufficient skill to manipulate the duration of the heat treatment in order to affect the characteristics of the resulting electrolyte bond while at the same time being mindful to not damage other battery components by excessive exposure to heat.

6. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Narang et al. in view of Schneider et al. in view of Gozdz et al. in view of Kawakami et al. as applied to claims 7-13, 16, and 17 above, and further in view of Oliver et al (U.S. Patent 5,688,293).

Regarding claims 14 and 15, Narang et al. teach that the sealing and charging steps of the battery may be “conventional” (see col. 11, line 12). However, the reference does not expressly teach that the electrodes are inserted into a film pack (claim 14), or that the electrolyte layers are integrated with each other after being inserted into the film pack (claim 15).

Oliver et al. is directed to a method of making a gel electrolyte battery. In column 5, line 22 et seq. and in each Example, the reference teaches that discrete cells are packaged between

metal foil laminate sheets to enclose the cell, and then the battery is exposed to a compression and heating step so as to seal the package and cure (gel) the battery cell.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the packaging and heating steps of Oliver in the process of Narang et al. First, as noted above, Narang et al. teach that the battery can be made in a "conventional" manner. Additionally, the sealing of the package and the curing (gelling) of the electrolyte of Oliver are combined into one step. The artisan would realize that, applied to the process of Narang, this step would result in a time and energy savings in making the battery. Thus, the artisan would be motivated to use this step in the process of Narang.

### ***Response to Arguments***

7. Applicant's arguments filed August 3, 2004 have been fully considered but they are not persuasive. Although Applicants generally assert that the application is believed to be in condition for allowance, it is submitted that the amendatory language is not sufficient to distinguish the claims over the prior art. In particular, Narang teaches a "lamination" step along with a "thermal cure" to form the battery. This "lamination" would be understood by a person of ordinary skill in the art to include the contacting of the electrode sheets with each other, and then the pressing of the sheets together under a certain pressure so as to form the unitary electrolyte. Claim 17 only recites a "pressing" step and is met by the pressing step of the reference. Claim 1

recites separate laminating and pressing steps. It is submitted that the claimed laminating and pressing steps would correspond to the contacting and pressing steps, respectively, of Narang. It is further noted that in the first full paragraph of page 14, the instant specification states that "[t]hen, the laminate is pressed so that an electrode laminate is manufactured." Thus, it appears that the lamination step of the specification is tantamount to a contacting step, or alternatively, the lamination step includes the pressing step. Thus, it is believed that given either interpretation, instant claim 1 is still met by the disclosure of Narang.

### ***Conclusion***

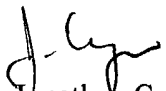
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Art Unit 1746  
September 3, 2004